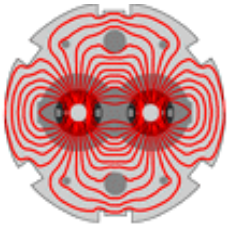


LARP

FY06 Strand R&D Tasks and Proposals for LARP

E. Barzi

- Mission
- Experimental setups and resources available
- Specs and procurement
- Characterization procedures
- Summary

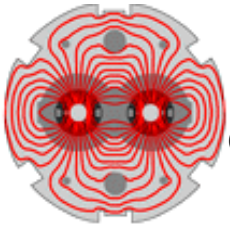
LARP

Mission

- **SUPPORT THE MAGNET PROGRAM**

  *** Strand specs and procurement**

  *** Strand characterization procedures and selection**



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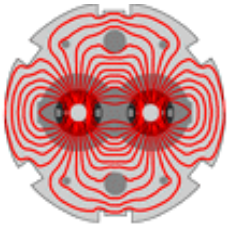
Experimental setups available

- **FNAL: 15/ 17 T, 1800 A; 14/16 T, 1000 A (by May '05)**
  - **STRAND**
  - **Low resistivity probe (< 40 nOhm) for Ic**
  - **Balanced coil magnetometer for magnetization (15 T max)**
  - **Probe for Ic tests under transverse pressure, 15 tons max**
  - **CABLE**
  - **28 kA SC transformer for tests at self-field (1.8 T)**
- **BNL: 11.5 T, 1200 for VH, 1500 A for VI**
  - **STRAND**
  - **Low resistivity probe (~ 25 nOhm) for Ic**
  - **Squid magnetometer for magnetization (5 T max)**
  - **CABLE**
  - **Cable test facility, 7 T max, 25 kA max**
- **LBNL: 15 T, 2000 A**
  - **STRAND**
  - **Low resistivity probe (< 30 nOhm) for Ic**
- **CERN: Fresca facility, 10 T max, 32 kA (40 kA w/transformer)**



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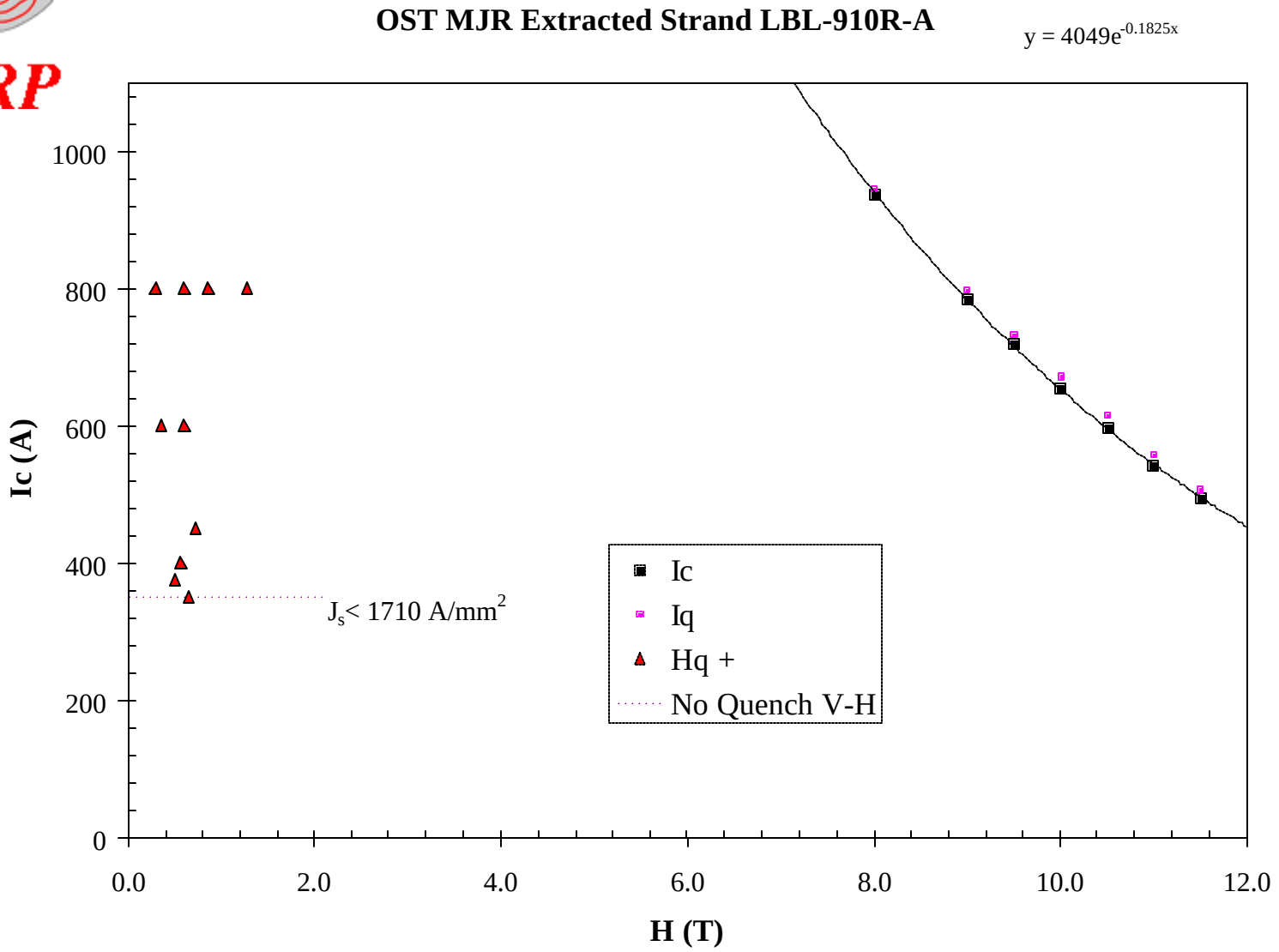
Human Resources available

- **FNAL:**
  - **Scientists & Engineers:**
    - **Barzi**
    - **Turrioni**
    - **Del Frate (up to 09/05, maybe extended)**
  - **2 Technicians**
- **BNL:**
  - **Scientists:**
    - **Ghosh**
  - **2-3 Technicians**
- **LBNL:**
  - **Scientists:**
    - **Dietderich**
    - **Student?**

UNSTABLE CONDUCTOR (STRAND)



UNSTABLE CONDUCTOR (CABLE)

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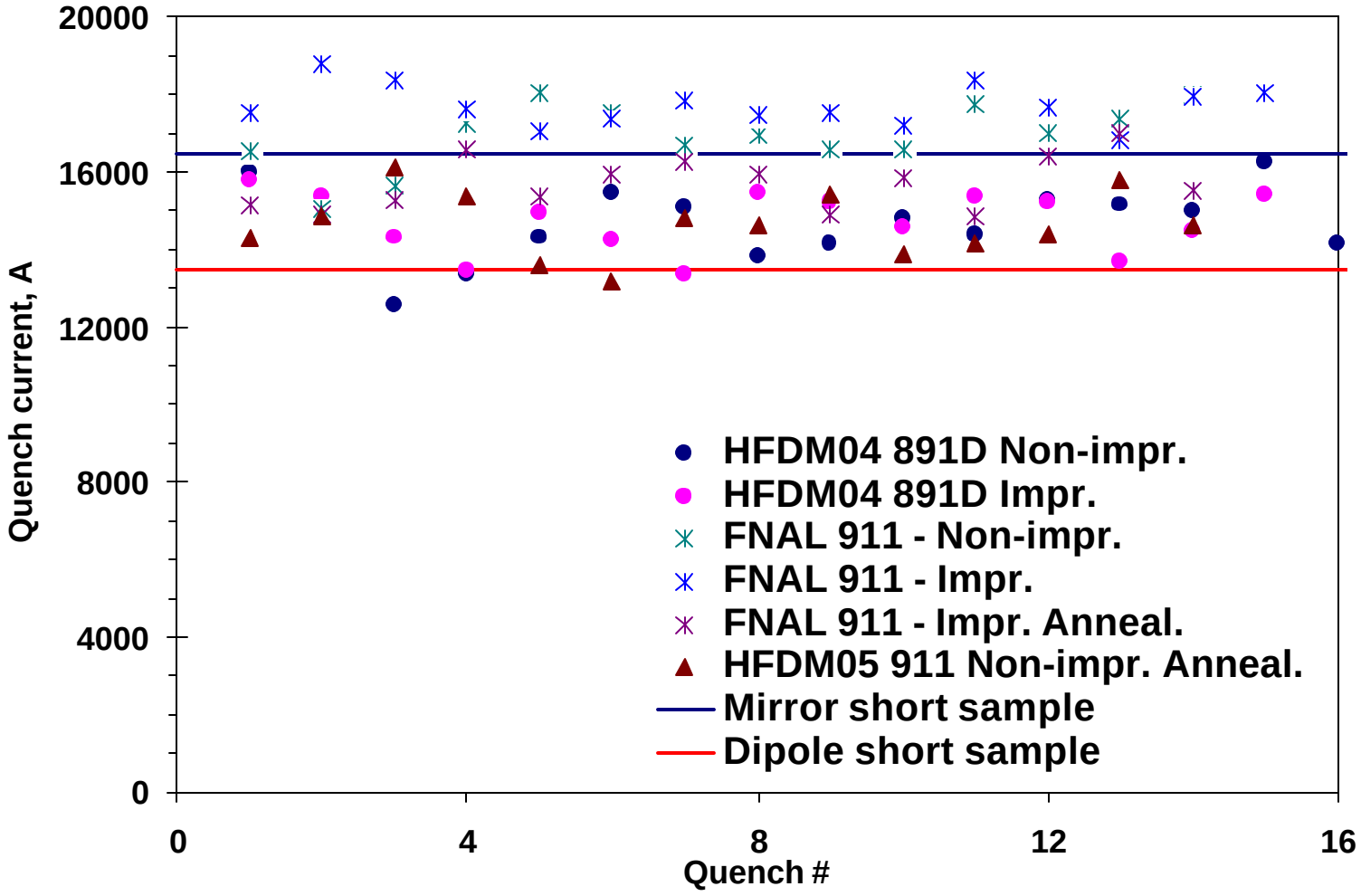

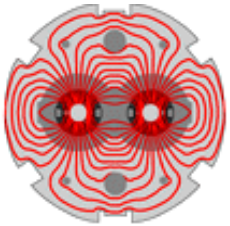

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SPECS

STABLE CONDUCTOR

Js (1.9 K) > Jc(12 T, 1.9 K)

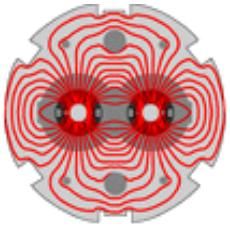
Js = min Jq when sweeping the field

Could CDP focus on LARP conductor needs?

OST is making good progress

108/127 design **Jc ~2200-2300 A/mm2**

Js > 4000 A/mm2



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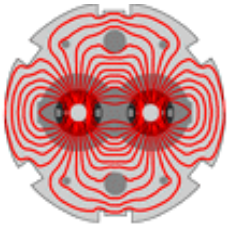
Procurement

6 to 9 months in advance of need

Item	Item Description			Conductor, **kg**	Coil completion	Strand delivery date
1	Replacement conductor for CDP inventory	TQ1a	FY05	30	Jan. 06	12/15/2005
2	Replacement conductor for FNAL Base program inventory	TQ2a	FY05	30	Mar. 06	12/15/2005
3	Strand for 2 more models Type:	TQ1a/2a	FY06	60		12/15/2005 ?
4	Strand for 2 more models Type:	TQ1b/2b	FY06	90	2007	7/15/2006
5	4-layer Quadrupole	TQ1				
6	Backup for FY06 coils (FY07 inventory)		FY06	75		7/15/2006
7	Long SM coil, 3.6m		FY06	25		12/15/2006
8	Long Cos-q mirror coil, 3.0m		FY06	36		12/15/2006
9	Rad-hard epoxy studies, 2 SM coils		FY06	6		12/15/2006
10	Open-midplane dipole "Proof-of-principle"		FY07	100		12/15/2006

Total (Nb3Sn)		**kg**	**452**	**k$ 497.2**



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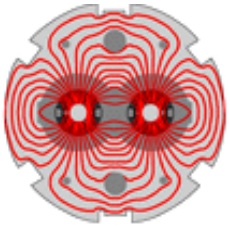
Characterization Procedures

*** What are the PROCEDURES we intend to follow to find out the information we need on the strands and cables to be used in the model magnets.**

*** Whenever such information is not available, due for instance to materials still under procurement, provide EXPECTATIONS based on existing results on similar materials**



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PROCEDURES

*** VI and VH of round and extracted strands between 1.9 K and 4.2 K**

*** RRR of round and extracted strands**

*** Magnetization of round and extracted strands between 1.9 K and 4.2 K**

TO ACCELERATE THE PROCESS, SIMULATE CABLING BY ROLLING

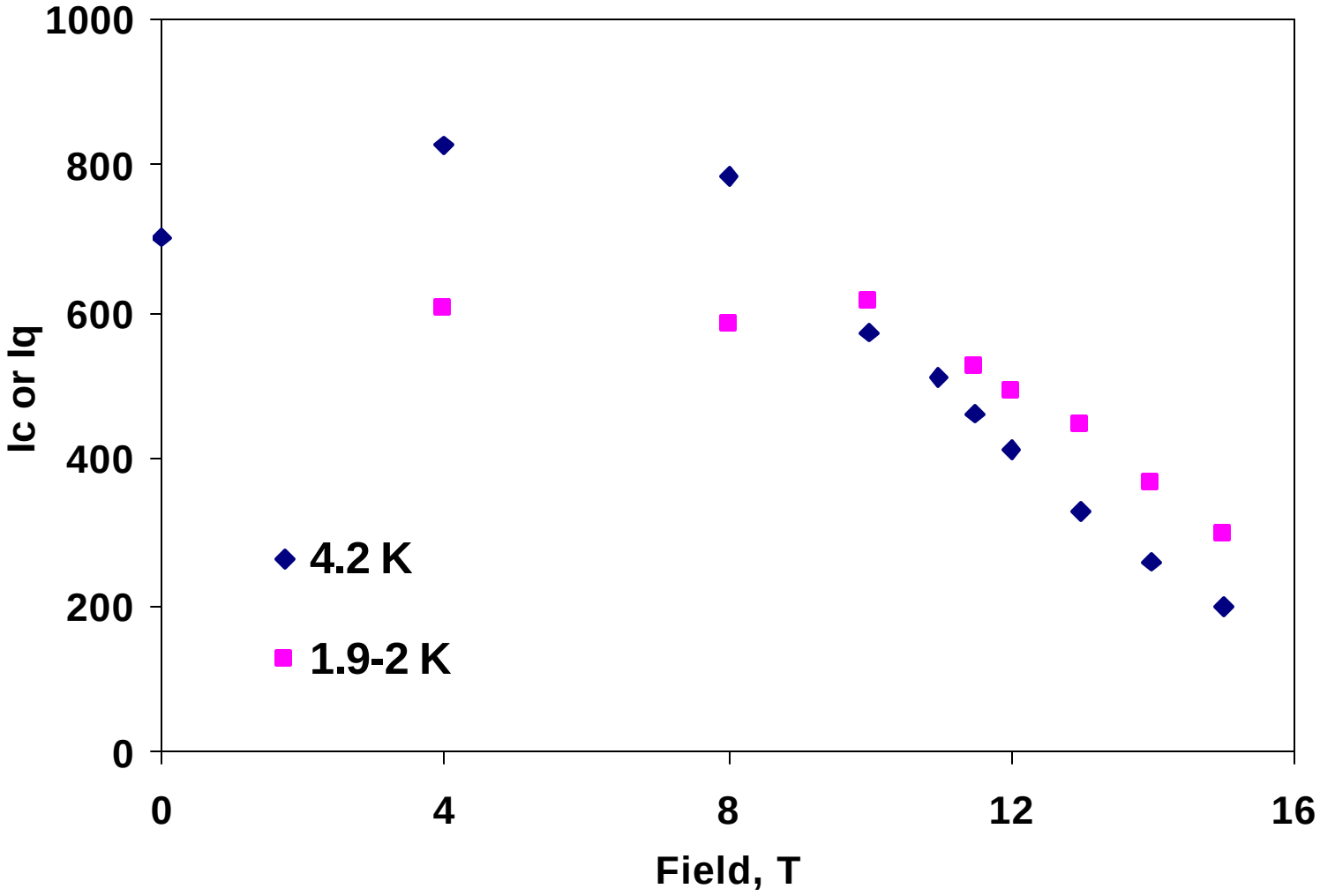
*** VI and VH on rolled strands between 1.9 K and 4.2 K**

*** RRR of rolled strands**

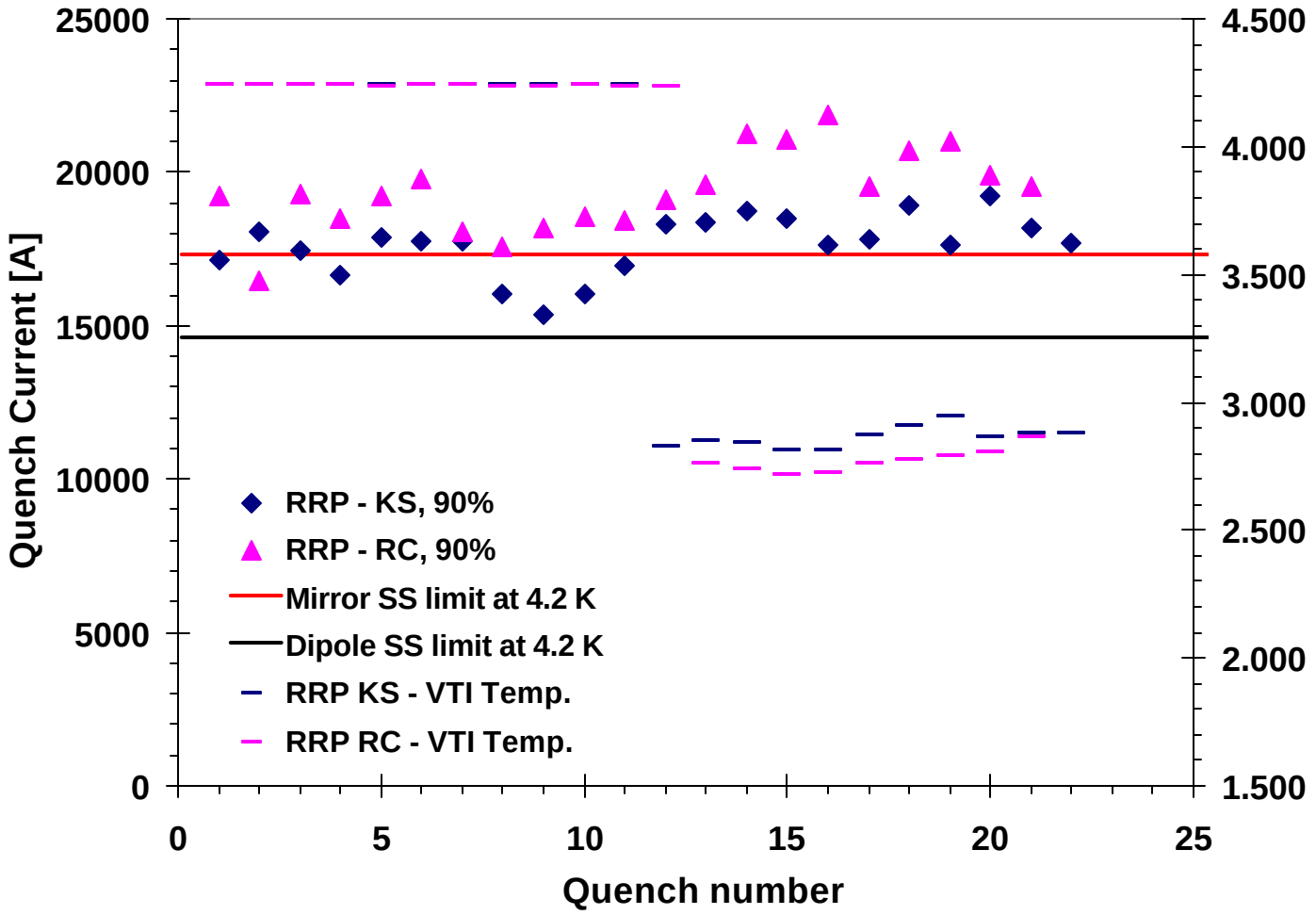
FOR EFFECT OF TRANSVERSE PRESSURE

*** Use FNAL setup between 1.9 K and 4.2 K**

PROCEDURES

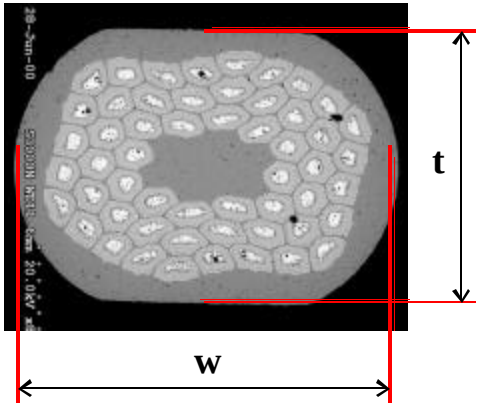


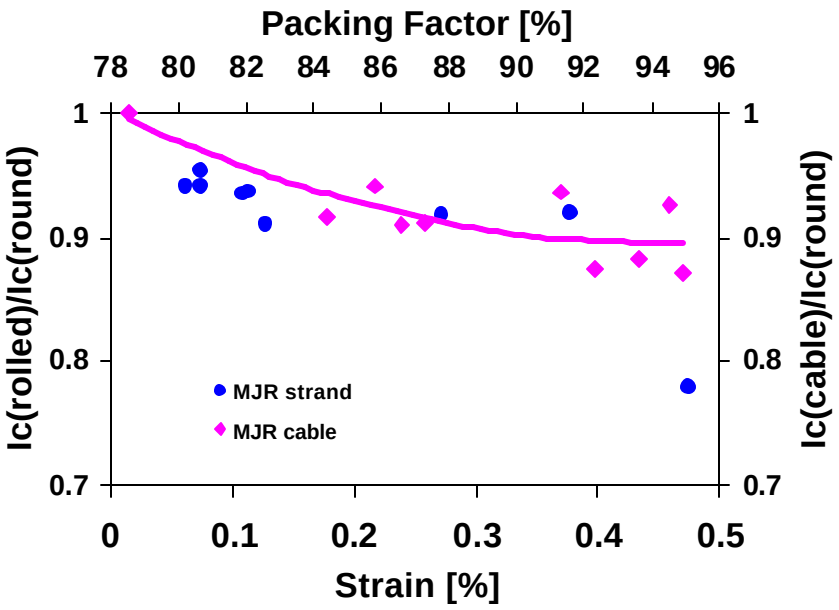
Cable Stability vs. SS limits



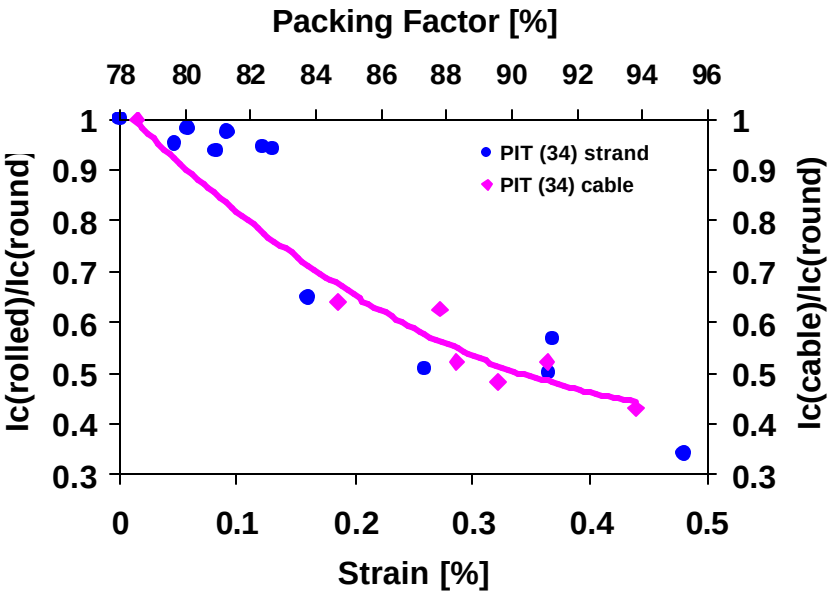
CABLING SIMULATION BY ROLLING

LARP





MJR



FIRST PIT BY SMI